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(54) [TITLE OF THE INVENTION] TELEVISION PROGRAM LISTING RECEIVING DEVICE

(57) [ABSTRACT]

[OBJECT] To provide a function for receiving television program listings automatically in a television broadcast receiving device such as a television or a VTR (videotape recorder), to make it possible to display a list of television programs and to set up recording using the listings.

[CONSTITUTION] A CPU 10 is programmed so as to be able to identify television listings codes that are sent in a specified format, from a signal that is superimposed on a television transmission. Data obtained thereby is recorded in a memory 11 The CPU 10, based on an instruction from a program selection inputting device 15, retrieves from the data stored in the memory 11 those items that are required, to display a list on a television screen When recording is specified, the television program start time and end time are retrieved from the data in the memory 11 to control the VTR in accordance with those times.

4: Tuner A
5: Tuner B
6: Tuner C
14: Multiplexer
13: Character Generator
9: Text Transmission Decoder
7: Display
12: Timer
11: Memory

[SCOPE OF PATENT CLAIMS]

[CLAIM 1] A device for receiving a data signal, such as a text transmission, that is superimposed on a television transmission, comprising:

means for converting television program listing data that is sent by the data signal into television program start and end time data;

means for creating and displaying a television program listing;

means for selecting a television program from the television program listing.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[FIELD OF USE IN INDUSTRY] The present invention relates to a television receiving device and to a videotape recorder having a television receiving function, and, in particular, relates to a device for receiving a data signal that is superimposed on a television broadcast transmission.

[0002]

[PRIOR ART] There are videotape recorders (hereinafter termed simply "VTR's") that have television broadcast receiving functions wherein it is possible to schedule the recording of a television program by setting the start time, the end time, and the channel number in a recording screen.

[0003] Additionally, there are also VTR's that are capable of encoding, into a series of numbers, television program broadcast schedules and channel numbers, enabling the scheduling of recording by merely inputting those numbers.

[0004]

[PROBLEM SOLVED BY THE PRESENT INVENTION] However, in order to schedule the recording in a VTR, it is necessary to look at the television program listings in a newspaper or magazine to find the code of the transmission time and channel number.

[0005] Additionally, because there is no program name connected with the code or the time, sometimes a trivial error in inputting can prevent the desired program from being recorded.

[0006] The present invention is the result of contemplation on the points set forth above, and the object thereof is to make it possible to view a listing of television programs on the television screen, to make it possible to schedule the VTR recording through selecting a program title on the screen, and to make it possible to change the channel in the television receiving device.

[0007]

[MEANS FOR SOLVING THE PROBLEM] In order to achieve the object set forth above, the present invention is a device for receiving a data signal, such as a text transmission, that is superimposed on a television transmission, provided with a circuit for obtaining and decoding a data signal for a program listing that is superimposed on the television transmission.

[0008] Furthermore, a memory for storing program listing data that is sent from each of the transmission channels, a controlling circuit for forming these data into a single program listing, a circuit for displaying the program listing, and an inputting device for selecting a program are also provided.

[0009]

[EFFECTS] The television program receiving device structured as described above makes it possible to display on a screen the program listing through operating a switch on the inputting device, and also makes it possible to schedule recording through selecting a program title in the VTR device, and makes it possible to switch to the channel corresponding to that program title in the television receiving device.

[0010]

[EXAMPLES OF EMBODIMENT] An example of embodiment according to the present invention will be explained in detail below in reference to the figures. In order to enable a television program listing receiving device, first it is necessary to superimpose the program listing data for transmission on the television transmission.

[0011] The text transmission method that has been in actual operation since November of 1985 can be used in order to send the television listing data signal superimposed on the television transmission. This text transmission enables the sending of encoded character data without having an impact on the image, through allocating, to the text data signal, the vertical return blanking period (the non-displayed portion) of the television video transmission signal.

[0012] Fig. 1 is a block diagram illustrating the structure of a television receiving device that includes a television program listing receiving device that is an example of embodiment according to the present invention, and includes the television receiving device 1 and the VTR set 2 that are illustrated in Fig. 1.

[0013] A signal that is received by an antenna 3 is demodulated into a video signal by a tuner A 4, a tuner B 5, and a tuner C 6.

[0014] The signal that is demodulated by the tuner A 4 is sent to a video display 7 (hereinafter termed simply the "display") through a video signal multiplexer 14 (hereinafter termed simply the "multiplexer"), and the signals that are demodulated by the tuner B 5 and the tuner C 6 are sent, respectively, to a VTR 8 and to a text transmission decoder 9.

[0015] The data that is obtained from the text transmission decoder 9 is sent to a CPU 10. The CPU 10 determines whether or not this data includes a program listing confirmation code 22 (described below), and if it includes the program listing confirmation code 22, then the CPU determines that the program is a program that includes program listing data, and stores [the data] in a memory 11, and the CPU 10 also switches the channel of the tuner C 6 to thereby receive program listing data for each of the broadcast channels.

[0016] At this time, the time required for the initial setup can be reduced by the use of a data card 16 in advance to provide the channel numbers of the broadcast channels that perform the program listing transmissions, the text transmission program numbers (hereinafter termed simply the "program numbers"), and the transmission schedule data.

[0017] When there is an instruction, by a program listing [SIC] selection inputting device 15, to display a program listing on the screen, the CPU 10 forms a program listing by reading out, from the data in the memory 11, and then combining the program titles and schedules, and then switches the input of the multiplexer 14 to the character generator, to convert the program listing into a text pattern,

through the character generator 13, to be displayed on the display 7

[0018] Fig. 2 is a front view illustrating the function wherein he program listing is displayed on the display 7 by an operation of the program selection inputting device 15. When there are many broadcast channels that are received, it is not possible to display all of the broadcast channels on the screen, and so the broadcast channel that is being received currently is displayed in the center. The scope of the display can be scrolled through operating switches that select up, down, left, and right on the screen.

[0019] Fig. 3 is a front view illustrating the function of selecting a program from the program listing by an operation of the program selection inputting device 15. By pressing the switch for selecting the program on the left, the entire display is scrolled one to the right, and the program that was displayed on the left side moves into the middle of the central program selection frame 20.

[0020] Fig. 4 is a front view diagram illustrating the function for displaying the program detail data on the display 7 by an operation of the program selection inputting device 15. When the switch for displaying the detail data is pressed, the CPU 10 finds the starting position for the detail data 40 from the program detail pointer 33 (described below) of the program listing data that is stored in the memory 11, and displays on the display 7 a series of data starting from that position.

[0021] Fig. 5 is a front view illustrating a function for switching the reception channel to the number that is selected, by an operation of the program selection inputting device 15. When the channel switching switch is pressed, the CPU 10 switches the tuner A 4 to the channel number corresponding to the program selection frame 20, switches the input of the multiplexer 14 to the tuner A 4, and displays the selected channel on the display 7.

[0022] Additionally, the VTR 8 can be scheduled for recording through operating the program selection inputting device 15. When the recording switch is pressed, the CPU 10 not only stores program identification data for the selected program into the memory 11, but also searches the memory 11 to record, in the timer 12, the start time for the program, and when the timer 12 is operating, the CPU 10 again searches the memory 11 to confirm the program start time, and if there has been no change, then starts the recording, where if there has been a change, then the new start time is stored again in the timer 12. If there has been a change in the broadcast time, then it is possible to change the recording start time through sending again the data for the program listing that has changed.

[0023] The text of the character generator 13 is displayed overlaid on the video of the tuner A4 by the multiplexer 14 when a program is selected, and when the tuner A4 is switched in accordance with the program selection, then the video and the program title can be viewed simultaneously.

[0024] In order to achieve the functions described thus far it is necessary to send program listing data that is formatted so as to be discernible by the CPU in the programs wherein the text transmission television program listings are sent. An example of the items, and the formats thereof, of this data will be described below.

[0025] Fig. 6 and Fig. 7 are specifications for the data for the television program listings that are placed in the text

transmissions used in the present example of embodiment, where, when all of the elements are incorporated into a single text transmission program, then the volume of the program would be quite large, and so the program listings are split and sent in the following two text transmissions:
Program listing text transmission A: Includes program titles and search codes for the program detail data.
Program listing text transmission B: Includes the details of the detailed program data.

[0026] Fig. 6 is a data structural diagram for the program listing text transmission A for sending the television program listings. The program listing confirmation code 22 is a string of characters or codes that are typically not used, and is a code that is the search key when the program number for the television program listing is ambiguous or unclear, and when received two or more times, then is not necessary because the program number for the program listing text transmission A is known from the data that has already been read in.

[0027] The current time 23 indicates the current date and time, and is used to set the time for the timer 12. Because of this, the time need not be set in a device that uses the present invention.

[0028] The channel number 27 indicates the number of the channel for the television broadcast corresponding to the program listings that have been sent. Note that "00" indicates that the program listing is a program listing transmitted from the local station, where if the transmission is received via a relay station, this will, of necessity, not match the channel number of the broadcasting station that transmitted initially, and so the content of the channel number 27 will be "00" in broadcasts, except for, specifically, when sending a program listing for another channel.

[0029] The transmitting channel name 28 indicates the name of the television channel corresponding to the program listing that has been transmitted, and will serve as the program listing broadcast channel name display 18.

[0030] The detailed program number 26 indicates the program number of the program listing text transmission B, where when this data is "000," it indicates that there is no program listing text transmission B. When this number is the same program number as the program listing text transmission A, then it is assumed that the program detail data 40 is included in the program listing text transmission A.

[0031] The program start time 30 indicates the transmission start time for the program, and is the same as the program start time 34 that is used in, for example, scheduling the recording of the VTR by comparing the time in the listing.

[0032] The program identification code 31 is used in order to perform identification when there is a redundancy with the detail of the program title 32 (described below). Note that this code is not displayed in the program listings on the television screen, and that, as data for an identification code, it cannot use the value of the program listing end code 39 (described below), with the same true for the program identification code 35.

[0033] The program title 32 indicates the title of the television program, where this data is used as the program title display 19 in the program listings, with the same true for the program title 36.

[0034] The program details pointer 33 indicates the starting position for the program detail data 40 (described below) for the program listing text transmission B. When "0152" is recorded as the data in the program details pointer 33, thus indicates that the program detail data 40 begins with the 152nd character of the program listing text transmission B, with the same true for the program details pointer 37 as well.

[0035] A single program data comprises the program start time 30, the program identification code 31, the program title 32, and the program details pointer 33, a total of four items, where these four items are repeated for several television programs to be transmitted.

[0036] The program end code 38, is similar to the program start time 30, but because it is followed by a program end code 39 (described below), it is used only as the end time for the previous program.

[0037] The program end code 39 indicates the end of the program listing data that is included in the program listing text transmission A, when the program identification code 31 has a particular combination of values. If there is a pause in the transmission, the interval for that pause is recorded as a program with the title "Transmission Paused."

[0038] The next transmission time 24 indicates the wait time until the next program listing text transmission A and program listing text transmission B.

[0039] The next program number 25 indicates the program number of the next program listing text transmission A. If this program number is "000," then this indicates that the transmission will have a program number that is identical to the current program number.

[0040] Given the above, the next program transmission time 24 and the next program number 25 are data for receiving the next program listing text transmission A quickly.

[0041] The footer data 29 is data that is displayed on the television screen as the footer data display 21 in Fig. 2, where the program sponsor name, a commercial, or some other message may be inserted here. Footer data 29 of the channel that is selected in the listings is displayed.

[0042] Fig. 7 illustrates the data structure of the program listing text transmission B that needs the television program listings. The program detailed data 40 can include a description of the program, actors appearing therein, or the like, and there is no particular limit on the length of the content, and is data corresponding to a single television program until the delimiter 41 (described below). That which is indicated by the program details pointer 33 is the position of the first character of this data. The same is true for the program details data 42.

[0043] The delimiter 41 is a code for delimiting the data of the program detailed data 40, where the same is true for the delimiter 43.

[0044]
[EFFECTS OF THE INVENTION] As described above, the television program listing receiving device according to the present invention makes it possible to select television programs and schedule the recording of a VTR simply and accurately by receiving automatically program listing data into a television receiving device without installing a special antenna or a special cable.

[BRIEF DESCRIPTION OF THE DRAWINGS]
Fig. 1 is a block diagram illustrating the structure of a television program listings receiving device that includes a VTR device in one example of embodiment according to the present invention.

Fig. 2 is a front view illustrating a screen of a program listing and the operation for displaying a program listing on a television screen in one example of embodiment according to the present invention.

Fig. 3 is a front view illustrating the changes in the screen and the operation for selecting a program from the program listings on the television screen in one example of embodiment according to the present invention.

Fig. 4 is a front view illustrating a display screen and the operation for switching the channel of a program that has been selected in one example of embodiment according to the present invention.

Fig. 5 is a front view illustrating a display screen and the operation for displaying detailed data for a selected program in one example of embodiment according to the present invention.

Fig. 6 is a data structural diagram illustrating the layout of data in the program listing text transmission A that includes, for example, the program title and the start time, used in the present invention.

Fig. 7 is a structural diagram of data indicating the data layout for a program listing text transmission B that includes the program details used in the present invention.

[EXPLANATION OF CODES]
1: Television Receiving Device
2: VTR Set
3: Antenna
4: Tuner A
5: Tuner B
6: Tuner C
7: Video Display
8: VTR
9: Text Transmission Decoder
10: CPU
11: Memory
12: Timer
13: Character Generator
14: Video Signal Multiplexer
15: Program Selection Inputting Device
16: Data Card
17: Time Display
18: Broadcast Station Name Display
19: Program Title Display
20: Program Selection Frame
21: Footer Data Display
22: Program Listing Confirmation Code
23: Current Time
24: Next Transmission Time
25: Next Program Number
26: Detail Program Number
27: Channel Number
28: Transmission Station Name
29: Footer Data
30: Program Start Time
31: Program Identification Code
32: Program Title
33: Program Details Pointer

34: Program Start Time
35: Program Identification Code
36: Program Title
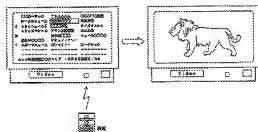37: Program Details Pointer
38: Program End Time

39: Program Listing End Code
40: Program Details Code
41: Delimiter
42: Program Details
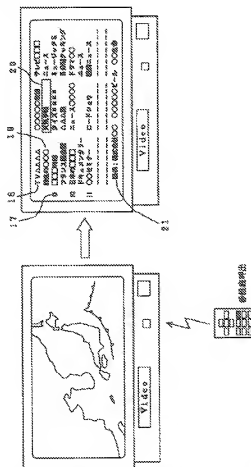43: Delimiter Data

Fig. 1
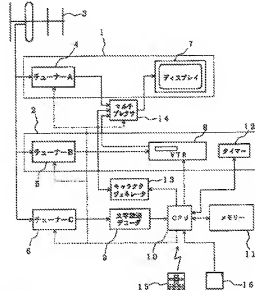
4: Tuner A
5: Tuner B
6: Tuner C
14: Multiplexer
13: Character Generator
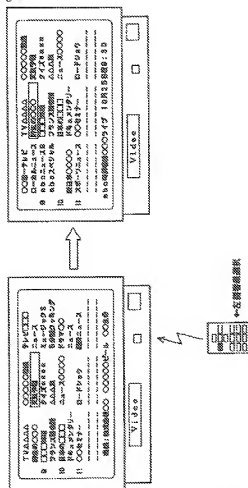9: Text Transmission Decoder
7: Display
12: Timer
11: Memory

Fig. 2

[IN SCREEN ON RIGHT--A matrix of television listings, with names of television stations across the top and what are presumably times down the left side]
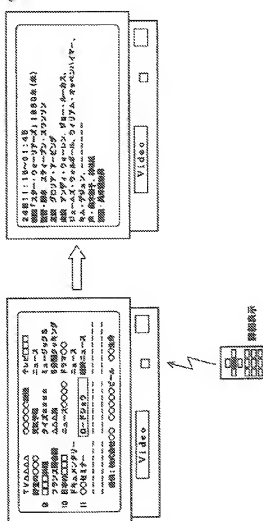[Bottom] Call Program Listings

Fig. 5

[IN SCREEN ON LEFT--A matrix of television listings, with names of television stations across the top and what are presumably times down the left side]
[Bottom] Select

Fig. 3

[IN SCREENS--A matrix of television listings, with names of television stations across the top and what are presumably times down the left side, where the screen on the right is shifted by one column from the screen on the left. The messages on the bottom of the screens, although illegible, are different on each screen]

[BOTTOM] Select Program on the Left Side

Fig. 4

[IN SCREEN ON LEFT--A matrix of television listings, with names of television stations across the top and what are presumably times down the left side]

[IN SCREEN ON RIGHT -- Date and time of the show, with the description of a movie, the actors, the voiceover actors -- mostly illegible]
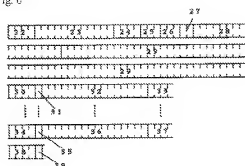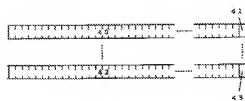
[BOTTOM] Display Details

Fig. 6

Fig. 7